

इंटरनेट

मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10000-9 (1980): Methods of tests for internal combustion engines, Part 9: Endurance tests [TED 2: Automotive Primemovers]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Internal Combustion Engines Sectional Committee, EDC 14; Methods of Test and Codes of Practice for Engines Subcommittee, EDC 14 : 3 [Ref: Doc : EDC 14. (3130)]

Indian Standard

METHODS OF TESTS FOR
INTERNAL COMBUSTION ENGINES

PART IX ENDURANCE TESTS

1. Scope — Specifies the method of conducting endurance tests on constant speed and variable speed internal combustion engines.

2. Section I — Endurance Tests for Constant Speed Engines — These tests shall be performed after the initial performance tests specified in IS:10000 (Part VIII)-1980 'Methods of tests for internal combustion engines: Part VIII Performance tests'.

2.1 After completion of the initial performance test the engine shall be run for 32 cycles (each of 16 hours continuous running) at rated speed.

2.1.1 Test cycle for IS Rating A

Load (Percent of Rated Load)	Running Time (Hours)
100	4 (including warm-up period of 0.5 h)
50	4
110	1
No load (Idling)	0.5
100	3
50	3.5

2.1.2 Test cycle for IS Rating B

Load (Percent of Rated Load)	Running Time (Hours)
100	4 (including warm-up period of 0.5 h)
50	4
100	1
No load (Idling)	0.5
100	3
50	3.5

2.2 At the end of each 16 hours cycle, the engine shall be stopped and necessary servicing and minor adjustments may be carried out in accordance with the manufacturer's schedule.

2.3 Before starting the next cycle, the temperature of the engine sump oil shall have reached within 5 K of the room temperature.

2.4 The engine shall be topped up with engine oil, if required and the quantity consumed recorded. In case the duration of the endurance test is longer than the period of oil change recommended by the engine manufacturer, the oil shall be changed according to the manufacturer's recommended schedule. The amount of make up oil used during the tests shall be used to establish the lubricating oil consumption rate.

IS : 10000 (Part IX) - 1980

2.5 If the engine needs to be stopped during any cycle for any minor attention, the running time of that cycle shall not be counted as part of the test and the cycle shall be recommenced. In case of power breakdown or breakdown of testing equipment, the test cycle shall not be scrapped and the remaining cycle time shall be completed on resumption of power or repair of test equipment, as the case may be. In case of a major breakdown the entire test shall be repeated from the beginning on another engine. For this purpose a minor breakdown is one which requires normal service adjustments and replacements as recommended by the manufacturer and a major breakdown is one which requires complete overhaul and changing of parts not covered by normal service adjustments and replacements. The major breakdown will also mean the breakdown or replacement of any of the critical components of the engine listed in IS : 10000 (Part VI)-1980 'Methods of tests for internal combustion engines: Part VI Recording of test results'.

2.6 During the endurance tests, periodic checks shall be made of the fuel and oil and they shall conform to the specifications of the manufacturers.

3. Section II — 100 Hour Test for Variable Speed Engines

3.1 Test Procedure—The test shall be conducted after the initial performance test and the speed limiter or governor check as specified in IS : 10000 (Part VIII)-1980. The test shall last for a total of 100 hours running time and shall consist of non-stop running periods of 10 hours duration with not less than 2 hours stoppage between consecutive running periods.

3.2 Each running period shall consist of five cycles of two hours duration made up of the following sequence of engine running conditions:

- a) 50 minutes at 75 percent of full load at the declared maximum speed;
- b) 45 minutes at full load at speed corresponding to maximum torque;
- c) 5 minutes at idling; and
- d) 20 minutes at full load at declared maximum speed.

3.3 During the tests, lubricating oil recommended by the manufacturer shall be used.

3.4 Before starting the next cycle the engine shall have reached within 5 K of the room temperature.

3.5 Results of the Test—The above results corrected to standard reference conditions shall be plotted on a time scale in accordance with IS : 10000 (Part VI)-1980.

3.6 The corrected power and the corrected torque shall at no time fall by more than 5 percent of the initial readings (at corresponding speeds) for more than two consecutive readings.

3.7 The corrected specific fuel consumption shall at no time increase by more than 5 percent above the initial performance test values.

3.8 A maximum of two interruptions to correct any fault and mal-adjustment shall be permitted during the full duration of the test. The nature of such adjustments shall be recorded.

3.9 If the engine needs to be stopped during any cycle for any minor attention, the running time of that cycle shall not be counted as part of the test and the cycle shall be recommenced. In case of power breakdown or breakdown of testing equipment, the test cycle shall not be scrapped and the remaining cycle time shall be completed on resumption of power or repair of test equipment as the case may be. In case of a major breakdown the entire test shall be repeated from the beginning on another engine. For this purpose a minor breakdown is one which requires normal service adjustments and replacements as recommended by the manufacturer and a major breakdown is one which requires complete overhaul and changing of parts not covered by normal service adjustments and replacements. The major breakdown will also mean the breakdown or replacement of any of the critical components of the engine listed in IS : 10000 (Part VI)-1980.

3.10 During the endurance tests, periodic checks shall be made of the fuel and oil. The oil shall conform to the specifications of the manufacturer.

EXPLANATORY NOTE

The testing and performance of constant speed and variable speed internal combustion engines was earlier covered by the following Indian Standards:

- i) IS : 1600-1960 'Code for type testing of constant speed internal combustion engines for general purposes'
- ii) IS : 1601-1960 'Performance of constant speed internal combustion engines for general purposes'
- iii) IS : 1602-1960 'Code for type testing of variable speed internal combustion engines for automotive purposes'
- iv) IS : 1603-1960 'Performance of variable speed internal combustion engines for automotive purposes'

These standards were originally issued in the year 1960 and as a result of implementation of these standards by the manufacturers of engines and testing laboratories, as also the operation of ISI Certification Marking Scheme, these standards have now been extensively revised.

While IS : 1600 and IS : 1602 covered the codes for type testing of constant and variable speed engines respectively, the performance requirements of such engines were covered by IS : 1601 and IS : 1603 respectively. These standards are replaced by two sets of standards, one set covers the methods of testing of engines and the other covers the specification and performance requirements of both constant speed and variable speed engines.

The standard covering methods of tests for internal combustion engines is being published in the following 12 parts (each part covering a particular test method or information related to methods of tests):

- i) IS : 10000 (Part I) Glossary of terms relating to test methods
- ii) IS : 10000 (Part II) Standard reference conditions
- iii) IS : 10000 (Part III) Measurements for testing, units and limits of accuracy
- iv) IS : 10000 (Part IV) Declarations of power, efficiency, fuel consumption and lubricating oil consumption
- v) IS : 10000 (Part V) Preparation for tests and measurements for wear
- vi) IS : 10000 (Part VI) Recording of test results
- vii) IS : 10000 (Part VII) Governing tests for constant speed engines and selection of engines for use with electrical generators
- viii) IS : 10000 (Part VIII) Performance tests
- ix) IS : 10000 (Part IX) Endurance tests
- x) IS : 10000 (Part X) Tests for smoke levels, limits and corrections for smoke levels for variable speed engines
- xi) IS : 10000 (Part XI) Information required with inquiry or order and information supplied by the manufacturer with the engine
- xii) IS : 10000 (Part XII) Test certificates

This standard will be complementary to specifications for performance requirements of different types of engines covered by the following standards:

- i) IS : 10001 Specification for performance requirements for constant speed compression ignition (diesel) engines for general purposes (up to 20 kW)
- ii) IS : 10002 Specification for performance requirements for constant speed compression ignition (diesel) engines for general purposes (above 20 kW)

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iii) IS : 10003 Specification for performance requirements for variable speed compression ignition (diesel) engines for automotive purposes

iv) IS : 10004 Specification for performance requirements for variable speed spark ignition engines for automotive purposes

Spark ignition engines for sprayers and similar applications have been covered by IS : 7347-1974 ' Specification for performance requirements of small size spark ignition engines for sprayers '.

Two stroke spark ignition engines for automotive applications which were earlier covered by IS : 1603 will be covered by a separate specification.

The revised methods of tests covered by IS : 10000 have been aligned with the current international practices in the field of I.C. engines. These parts are in general agreement with the following ISO standards — issued by the International Organization for Standardization:

- a) ISO 3046/I-1975 Reciprocating internal combustion engines — Performance: Part I Standard reference conditions and declarations of power, fuel consumption and lubrication oil consumption
- b) ISO 3046/II-1977 Reciprocating internal combustion engines — Performance: Part II Test methods
- c) ISO 3046/III-1979 Reciprocating internal combustion engines — Performance: Part III Test measurements
- d) ISO 2710-1978 Reciprocating internal combustion engines — Vocabulary

IS : 10000 (Part I to Part XII) and IS : 10001, IS : 10002, IS : 10003 and IS : 10004 collectively supersede IS : 1600, IS : 1601, IS : 1602 and IS : 1603.